REMARKS

This Amendment is responsive to the second Office Action of Dec. 19, 2003. Entry of the following amendments and reconsideration and allowance of claims 1, 2, 5, 7-17, 20-22, and 25-28 as set forth herein is respectfully requested.

The Office Action

The previously allowability of claims 3, 4, 7, 10, 12, 14, and 16 indicated in the first Office Action of Feb. 4, 2003 is withdrawn in the current Office Action of Dec. 19, 2003. These claims now stand rejected based on new references, which were apparently identified in a new search performed after issuance of the first Office Action of Feb. 4, 2003.

The newly identified and applied references are:

Serizewa et al., U.S. patent no. 4,733,335 (hereinafter "Serizewa");

Jennings, U.S. patent no. 3,275,874 (hereinafter "Jennings");

Opolka, German patent no. DE 20004105 U1 (hereinafter "Opolka"); and

Sylvester et al., U.S. patent no. 6,160,596 (hereinafter "Sylvester").

As the withdrawal of allowability of claims 3, 4, 7, 10, 12, 14, and 16 is premised on these new references, the current Office Action of Dec. 19, 2003 is non-final.

In the current Office Action of Dec. 19, 2003, all claims now stand rejected as follows.

Claim 3 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Serizewa.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Serizewa in view of Opolka.

Claims 1, 2, 5, 8-11, 13, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer et al., U.S. patent no. 6,161,910 (hereinafter "Reisenauer") in view of Jennings.

Claims 12 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer in view of Jennings and Sylvester.

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer in view of Jennings and Pederson, U.S. patent no. 6,367,949 (hereinafter "Pederson").

Claims 17-19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Reisenauer.

Claim 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer in view of Garufo, German patent no. DE 19528459 A1 (hereinafter "Garufo").

Claim 21 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer.

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer in view of Serizewa.

Claims 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reisenauer in view of Sylvester.

Notwithstanding the indicated withdrawal of allowability of claim 7, Applicants find no written explanation of the rejection of claim 7 in the current Dec. 19, 2003 Office Action.

The specification is amended to include the provisional priority information

The amendment to the specification relates to the priority claim to U.S. Provisional Application No. 60/293,827 filed on May 26, 2001. This priority claim was also included in the Application Data Sheet and in the Declaration filed with the present application, and is properly identified on the USPTO PAIR database.

The new references do not address patentable aspects of the present application

Applicants are unclear as to why newly identified and applied references Serizawa and Jennings are viewed as more pertinent than other references applied in the first Office Action. Both Reisenauer, which was applied in the first Office Action, and the new reference Serizawa show an LED assembly connected with a heat sink having fins. However, neither reference shows a heat sink with an elongated core drawing heat away from the LED assembly.

The current Office Action states that the Applicants' arguments in Amendment A were considered but are moot in view of the new references. However, those arguments expressly emphasized the advantages of a heat sink with a thermally conductive elongated core and a plurality of fins or other heat dissipating elements disposed around the elongated core. Those arguments further pointed out that Reisenaur discloses a disk or plate shaped heat sink which cannot be considered to be elongated, whereas Applicants elongated design pulls heat further from the lamp electronics and provides a more effective heat dissipation mechanism.

None of the new references address these arguments. Serizawa shows a disk or plate shaped heat sink which is very similar to that of Reisenaur. There is nothing in Serizawa's plate shaped heat sink 153 that could be described as "elongated" or that would serve to pull heat away from the LED assembly as does the elongated core of the present application's heat sink.

New reference Jennings relates to a sealed-tube heat radiator. Contrary to the Office Action's assertion at the top of page 6, Jennings does not relate to a lighting device. The Office

Action identifies element 10 in Jennings as "a lighting device"; however, the specification of Jennings identifies element 10 as "a heat radiator" (see last line of col. 1 which finishes as the top line of col. 2). The filament 14 of Jennings is designed to produce heat radiation (see, e.g., col. 2 lines 15-35). Jennings suggests a preferred operating temperature of 1800-2000 °F (col. 1 line 19), which would produce blackbody radiation with a peak wavelength of about 2.1-2.3 microns. Thus, at most the filament 14 may produce a dull red glow typical of an ordinary space heater or other heat radiator. Applicants submit that one skilled in the art would not view such a heat radiator as a "lighting device".

Jennings does show heat-dissipating fins 26; however, these fins are not disposed around a thermally conductive core. Rather, they are disposed around the neck 11b of housing 11, which is either evacuated or filled with an inert gas (col. 3 lines 21-26). Vacuum and inert gases are generally poor thermal conductors, since there is little or no material to conduct heat. The housing 11 itself is a thin sheet of Nichrome (top of col. 2). The neck 11b is shielded by a reflector 18 to reduce heat coupling thereto (col. 2 lines 48-54). Far from being used as a heat sink, the neck 11b is intentionally shielded from receiving heat. At most, Jennings discloses the basic concept of using fins to dissipate heat. It discloses nothing relating to the heat sink arrangements for lighting sources disclosed in the present application.

New reference Opolka is applied in the Office Action only to claim 4, which is canceled herein.

New reference Sylvester is applied by the Office Action for its disclosures relating to color characteristics of LEDs and color mixing. It does not address heat sinking, and it is not applied in the Office Action for that purpose.

Claims 1, 2, 5, and 7-16 patentably distinguish over the references of record

Claim 1 calls for a light module including a light emitting diode assembly with a generally planar front side light emitting diode array and a rear side thermally communicating with a thermally conductive spreader, and a thermally conductive elongated core having a first end thermally communicating with the conductive spreader. The thermally conductive core is elongated in a direction transverse to the generally planar front side light emitting diode array to define a second end distal from the conductive spreader. A plurality of appendages disposed around the thermally conductive core are in thermal communication with the conductive spreader and extend away from the thermally conductive core.

Claim 1 has been amended herein to more particularly specify the light module as having a generally planar light emitting diode array and an elongated thermally conductive core elongated in a direction transverse to the generally planar diode array.

Reisenauer does not disclose or suggest an elongated thermally conductive core such as is called for in claim 1. Element 28 of Reisenauer is identified in the Office Action at page 5 as "a thermally conductive elongated core." This element is illustrated in Reisenauer Fig. 4: it is clearly disk shaped, and could probably be described as "generally planar". Applicants find no aspect of element 28 which could conceivably be called "elongated."

Newly identified and newly applied reference Jennings does not cure this deficiency in Reisenauer, because Jennings does not show anything resembling an elongated thermally conductive core. Indeed, the Office Action does not expressly state that it does; rather, the Office Action at page 6 asserts that Jennings shows "thermally conductive appendages 26 extending around the core 11[b]." While Jennings certainly shows heat dissipating fins, it does not show these fins extending around a thermally conductive elongated core. The neck 11b is not a thermally conductive core; to the contrary, it is an evacuated or inert-gas-filled neck that is never referred to as thermally conductive, and is most likely substantially thermally insulating. Moreover, the neck 11b is not intended to draw heat away from the thermal filament 14; rather, the neck 11b is intentionally shielded from heat by the thermal reflector 11.

The fins disposed on the neck 11b apparently provide a cooling mechanism to remove stray heat. Thus, at most Jennings discloses the general concept of using heat-dissipating appendages for cooling. It does not disclose or fairly suggest a plurality of appendages disposed around the thermally conductive core extending away from the thermally conductive core, as called for in claim 1.

Regarding dependent **claim 2**, the Office Action does not indicate any disclosure or fair suggestion in either Reisenauer or Jennings of an optic removably affixed to the housing opposite the front side light emitting diode array.

Regarding **claim 5**, this claim has been amended herein to call for the plurality of appendages to comprise fins surroundingly attached to the thermally conductive core. In the embodiments called out in claim 5, the fins do not contact the thermally conductive spreader. Rather, the fins thermally conductively communicate with the thermally conductive spreader through the thermally conductive elongated core. The amendments to claim 5 are supported at least by Figs 1-3 of the present application, which illustrate examples of this arrangement. Applicants do not find this arrangement in the references of record. The arrangement called out in claim 5 advantageously spatially separates the heat-dissipating fins from the light emitting

diode assembly. The advantageous configuration called for in claim 5 is enabled by the thermally conductive elongated core.

Regarding **claim 7**, the Office Action indicates that the previously stated allowability of this claim is withdrawn in view of the newly identified references. However, Applicants are unable to find a written explanation of the rejection of claim 7 in the Office Action. Applicants respectfully request clarification of the status of claim 7.

Claim 11 has been amended to call for the thermally conductive core to have an electrical conduit passing from the first end to the second end to provide electrical access to the front side light emitting diode array from the second end of the thermally conductive elongated core. A physical size and shape of an exterior of the thermally conductive elongated core and the electrical conductor are designed to be accommodated in a fixture selected from a group consisting of MR-style fixtures and PAR-style fixtures. This amendment is supported in the specification at least at ¶[0024].

The Office Action rejected claim 11 stating that recitation of intended use cannot provide a patentable distinction. Claim 11 has been amended herein to obviate that rejection by calling for specific structure, including the elongated thermally conductive core having the electrical conduit, that enables the particular application. MR and PAR-style fixtures are standardized fixtures having a relatively wide front light-emitting end and a narrower socket rear end. The thermally conductive elongated core, including the electrical conduit called for in claim 11, enables the light module to be used in such an MR or PAR-style fixture.

Accordingly, Applicants respectfully submit that claims 1, 2, 5, and 7-16 as set forth herein patentably distinguish over the references of record, and ask that claims 1, 2, 5, and 7-16 as set forth herein be allowed.

Applicants ask for reconsideration of claim 17

The current Office Action asserts at page 14 that Applicants arguments in Amendment A pertaining to claim 17 have been fully considered but are moot in view of the new grounds of rejection. The grounds for rejecting claim 17 are exactly the same in the current Office Action as in the earlier Feb. 4, 2003 Office Action: in both Office Actions, claim 17 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Reisenauer. Applicants therefore respectfully ask for reconsideration of claim 17.

Claims 20 and 28 patentably distinguish over the references of record

Claim 20 has been placed into independent form, and calls for a light emitting diode assembly including a thermally conductive core supporting a generally planar light emitting face having a plurality of light emitting diodes disposed thereon. Electrical connection elements pass through the thermally conductive core. Thermally conductive elongated pillars are attached to a side of the thermally conductive body opposite the light emitting face. The thermally conductive elongated pillars extend away from the thermally conductive core.

Claim 20 stands rejected based on Garufo. The Office Action asserts that Garufo discloses an LED light fixture comprising a plurality of appendages 8 being rods.

The German specification of Garufo refers to elements 8 as "Kühlrippen" (col. 3 line 11 and col. 3 line 22) or as "Rippen" (col. 4 line 29). A review by Applicants of several German-English dictionaries indicates that "Kühl" translates into English as "cool" or "cooling", while "rippen" translates into English as "ribs". "Kühlrippen" was not listed, but presumably translates as "cooling ribs." It therefore appears to Applicants that elements 8 are cooling ribs which are viewed on-end in the sectional figure of Garufo.

It is respectfully submitted that one skilled in the art would not interpret "cooling ribs" as elongated pillars, but rather as elongated planar cooling ribs or fins such as are commonly used in ribbed radiators or ribbed heat exchangers. The thermally conductive pillars of claim 20 have certain advantages over such cooling fins or ribs. For example, a row of pillars has a larger surface area for radiating heat than does a corresponding single rib.

Accordingly, Applicants respectfully submit that claims 20 and 28 as set forth herein patentably distinguish over the references of record, and ask that claims 20 and 28 as set forth herein be allowed.

Claims 21, 22, and 25-27 patentably distinguish over the references of record

Claim 21 calls for a lamp for use in connection with spot module platforms. A plurality of LEDs are arranged in an LED assembly having opposing forward-illuminating and rearward facing sides. A heat sink contacts the rearward facing side of the LED assembly to draw heat from the LEDs, and includes (i) a thermally conductive base having a lateral area substantially coextensive with the rearward facing side of the LED assembly and in thermal contact with the rearward facing side of the LED assembly, and (ii) an elongated thermally conductive core having a lateral area less than the lateral area of the rearward facing side and connecting with a central area of the thermally conductive base. The elongated thermally conductive core extends from the thermally conductive base in a direction away from the LED assembly. A heat

dissipating structure connected with the elongated thermally conductive core includes a plurality of heat-dissipating members each extending away from a connection of the heat-dissipating member with the heat sink.

None of the references of record disclose a heat sink including a thermally conductive base (corresponding, for example, to the heat spreaders 60, 60' in the Figs. 1 and 2 or the metallic slug 110 of Fig.3) substantially coextensive with the rearward facing side of the LED assembly to provide heat spreading and an elongated thermally conductive core having a lateral area less than the lateral area of the rearward facing side. The heat sink 28 of Reisenauer is substantially co-extensive with the LED assembly 26; however, Reisenauer discloses no element corresponding to the elongated thermally conductive core of claim 21. Serizawa also does not disclose or fairly suggest an elongated thermally conductive core. Regarding Jennings, the housing neck 11b of Jennings is not a thermally conductive core. Moreover, the neck 11b connects only with the remainder of the housing 11a, which is not in thermal contact with a rearward facing side of an LED assembly. Indeed, neither LEDs nor any other type of light source are even mentioned in Jennings.

New **claim 27** specifies that the heat dissipating structure is not connected with the thermally conductive base of the heat sink. This claim is supported at least by Figs. 1-3, which illustrate such an arrangement. In Reisenauer the planar heat sink 28 appears to contact the fins-bearing structure 30. In Serizawa, the fins 163 not only contact the planar heat sink 153, but appear to be integrally formed therewith (see the cross-section shown in Fig. 12, in which a continuous section cross-hatching extends from the heat sink 153 into the fins 163).

Accordingly, Applicants respectfully submit that claims 21, 22, and 25-27 as set forth herein patentably distinguish over the references of record, and ask that claims 21, 22, and 25-27 as set forth herein be allowed.

CONCLUSION

Based on the foregoing, it is respectfully submitted that claims 1, 2, 5, 7-17, 20-22, and 25-28 as set forth herein are now fully in condition for allowance. Accordingly, allowance of claims 1, 2, 5, 7-17, 20-22, and 25-28 as set forth herein is earnestly requested.

Respectfully submitted,

FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP

Robert M. Sieg 3-19-04

Scott A. McCollister, Reg. No. 33,961
Robert M. Sieg, Reg. No. 54,446
1100 Superior Avenue
7th Floor
Cleveland, OH 44114-2516

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